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ABSTRACT

Four-year old children in the New York State Experimental Prekindergarten Program (PreK) were administered three cognitive and two behavioral measures to determine if the data would provide sets of a smaller number of variables, to see if the variables overlapped, and to determine the appropriateness or redundancy of the tests. The tests were: the (1) Walker Readiness Test for Disadvantaged Preschool Children; (2) Cooperative Preschool Inventory; (3) Peabody Picture Vocabulary Test; (4) California Preschool Social Competency Scale; and (5) Schaeffer's Classroom Behavior Inventory. Factor analysis incorporated nine socioeconomic background variables, two duration/attendance variables, 18 cognitive variables, and eight behavioral variables. These variables were reduced to parent education; family income and size; length of residence; factual and conceptual knowledge; perceptual discrimination; social adjustment or constructive participation; extraversion/introversion; hours present and prior PreK experience; and elapsed time between pretest and posttest. Results indicated that the ordering of large numbers of variables into smaller numbers of interpretable factors affords more insight into the structure of a data set. The Peabody Picture Vocabulary Test and the Cooperative Preschool Inventory contained the same general cognitive/verbal dimension. Analysis of the Classroom Behavior Inventory indicated that the instrument has high stability and three components in common with the California Preschool Social Competency Scale. (JAC)

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FACTOR ANALYSIS OF COGNITIVE, BEHAVIORAL, SOCIOECONOMIC AND RELATED CHARACTERISTICS OF PREKINDERGARTEN CHILDREN

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FACTOR ANALYSIS OF COGNITIVE, BEHAVIORAL, SOCIOECONOMIC AND RELATED CHARACTERISTICS OF PREKINDERGARTEN CHILDREN

The New York State Experimental Prekindergarten Program (PreK) serves approximately 5,000 four-year-old children and 1,500 three-year-old children in 52 school districts. As part of a longitudinal study of the program, (Evaluation Design, 1975) several measures were administered to the four-year-old children in the fall of 1975 and to a sample of the same children in the spring of 1976. In addition, data were collected on selected background variables, including data on the child, socioeconomic data on the child's family, and program duration and attendance data. The same data were collected on a control group made up of children who were eligible for the prekindergarten program but were not enrolled.

The factor analysis of the variables in this study was intended to serve several purposes. In the first place, the data comprised a fairly large number of variables (37), supposedly subdivided into at least three areas. This mass of data required some method of simplication. Were there in fact several sets of variables, and, if so, did they correspond to those we had hypothesized, that is, background, cognitive and behavioral domains? Secondly, we wanted to determine to what extent there was overlap among the variables in what they measure. Were the cognitive tests or behavioral ratings redundant? Could one or more tests be eliminated? Third, we wanted to test the units of measurement for appropriateness. For example, did the subtest scores of the Classroom Behavior Inventory actually represent true subsets of this scale based on underlying dimensions, or were there other groupings of items which would be more appropriate as subtest scores in the analysis? Finally, new variables could be constructed using factor scores. Several of the

background variables, for example, might be consolidated into one, thus achieving a set of parsimonious variables. Or the variance in a total test score, such as that for the California Preschool Social Competency Scale, could be decomposed into several underlying dimension scores by factor analyzing the component item scores. The resulting factor scores would probably be more suitable variables for the study of program effects than the original global score, because they would be "cleaner" measures, that is, relatively uncontaminated by error variance and also uncorrelated with each other.

THE SUBJECTS

Since it was desired to have equal N's on all variables, the population of approximately 5,000 children in the Prekindergarten program was reduced for the pretest analysis to a sample of 1,731. This was accomplished by eliminating all cases which had missing or suspect data on any variable. (This had the concomitant effect of eliminating all control group children since there were no teacher ratings for the control group.) For the analyses which included posttest scores, the sample was further reduced by the same procedure to 595. The background characteristics of these two groups are similar to those of the group of 1,866 PreK children described elsewhere by Hick, Kukuk, Horan and Irvine (1977), except that (a) children whose primary language is other than English have been eliminated because of problems in administration of the Peabody test, and, (b) the levels of Mother's Education and Family Income are slightly lower.

THE MEASURES

Three cognitive measures and two behavioral measures were used in the analysis reported here:

Walker Readiness Test for Disadvantaged Preschool Children (Walker, 1969) - A 50-item non-verbal measure of general reasoning, originally developed as a culture-fair, individual readiness test for disadvantaged preschool children in the United States. Each item consists of a set of pictures and the child is requested to choose one of the pictures according to the instructions for that section of the test. The four subtests are:

1. Similarities - From the four option pictures, the child must choose the picture which is identical to the stimulus picture.
2. Differences - From the four pictures the child must choose the one that is different with respect to size, characteristic or category.
3. Numerical - From four collections of objects the child must select the collection which has the same number of objects as the stimulus collection.
4. Missing Parts - From the four option pictures, the child must choose the one that completes the stimulus picture.

Cooperative Preschool Inventory (Addison-Wesley Publishing Company, 1970) - A 64-item measure of achievement in several areas regarded as important for success in school, originally constructed to evaluate the first Head Start programs. The test is designed for individual use with children in the age range of three to six years. Most of the questions deal with specific behaviors falling into four categories: personal-social responsiveness, associative vocabulary, concept activation-numerical and concept activation-sensory.

Peabody Picture Vocabulary Test (American Guidance Service, 1965) - An individually administered measure of ability to understand spoken English. The child is presented with a set of four pictures, is given a stimulus word orally, and is instructed to select the picture which is the equivalent of the stimulus word. Items are ordered in a progression of difficulty.

California Preschool Social Competency Scale (Consulting Psychologists Press, Inc., 1969) - A 30-item rating scale "designed to measure the adequacy of preschool children's personal behavior and the degree to which they assume social responsibility . . . . The items cover a wide-range of behaviors such as response to routine, response to the unfamiliar, following instructions, making explanations, sharing, helping others, initiating activities, giving direction to activities, reaction to frustration, and accepting limits . . . . Each item contains four descriptive statements which represent varying degrees of competency relative to the behavior measured by that item. The items require observations of actual performance rather than inferences about presumed abilities or capacities." (Levine, Elzey, and Lewis, 1969, pp. 3-4).

Classroom Behavior Inventory (Schaeffer, 1975) - An 18-item rating scale designed to measure three dimensions of a child's affective behavior in the classroom. Each item consists of a statement describing some aspect of classroom behavior. The rater is instructed to rate the child in relation to this statement on a 4-point scale ranging from 1 = "Not at all like" to 4 = "Very much like". The three dimensions measured are bipolar in nature. They were determined by factor analysis when the scale was developed. They include: (1) Task-orientation/Distractibility, (2) Hostility/Considerateness and (3) Extraversion/Introversion.

Six items load on each dimension, three on each pole. The score for each dimension is derived by subtracting the combined score of the items loading on one pole from the combined score of the items loading on the other pole. This yields subtest scores which can range from -9 to +9.

THE VARIABLES

The 37 variables used in the analysis are listed in Table 1. There are nine background variables, two duration/attendance variables, 18 cognitive test variables, and eight behavior rating variables.

THE ANALYSIS

Factor Analysis of Total Set of Variables

Two methods of factor analysis were used, principal components (1's in the main diagonal) and common factor analysis (starting with R^2 in the main diagonal, followed by iterative communality estimate improvement procedure). Both methods were followed by Varimax rotation of factors with eigenvalues equal to or greater than 1.0.

Both methods were applied first to pretest data in the following sequence: all variables, background variables only, cognitive tests only, and cognitive tests and behavior ratings together. Posttest data were analyzed in similar fashion. Finally, pretest and posttest data were analyzed together, along with duration and attendance data. This final analysis included also an oblique rotation in addition to the orthogonal Varimax rotation. Since all of these analyses produced similar

Table 1

Variables Used in PreK Factor Analysis

	Measures	Label	Description	Item Nos.
BACKGROUND		AGEPREW	Age at time of Pretest on Walker	
		EXPK	Previous months experience in NYS Experimental PreK Program (as 3 yr. old)	
		MOED	Mother's education (years)	
		FAED	Father's education (years)	
		INCOME	Income	
		RESIDE	Years residence at current address	
		NOADULT	Number of adults in residence	
		NOCHLD	Number of children in residence	
		NOROMS	Number of rooms in residence	
DURATION ATTENDANCE		DABETW	Elapsed time in days between Walker pretest and posttest	
		ATTENDCE	Hours present from entry into Program up to date of posttest	
COGNITIVE TESTS	Walker Pretest	PRESIM	Similarities	1-25
		PREDIFF	Differences	26-40
		PRENUMA	Numerical Analogies	41-45
		PREMISS	Missing Parts	46-50
	Walker Posttest	POSTSIM	Similarities	1-25
		POSTDIFF	Differences	26-40
		POSTNUMA	Numerical Analogies	41-45
		POSTMISS	Missing Parts	46-50
	Cooperative Pretest	PRERESP	Personal-Social Responsiveness	1-18
		PREVOC	Associative Vocabulary	19-30
		PRENUM	Concept Activation-Numerical	31-38, 42-48
		PRESENS	Concept Activation-Sensory	39-41, 49-64
	Cooperative Posttest	POSTRESP	Personal-Social Responsiveness	1-18
		POSTVOC	Associative Vocabulary	19-30
		POSTNUM	Concept Activation-Numerical	31-38, 42-48
		POSTSENS	Concept Activation-Sensory	39-41, 49-64
	Peabody Pretest	PREPEAB	Peabody pretest total raw score	
	Peabody Posttest	POSTPEAB	Peabody posttest total raw score	
BEHAVIOR RATINGS	California Pretest	PRECAL	California pretest total raw score	
	California Posttest	POSTCAL	California posttest total raw score	
	Classroom Pretest	PREHC	Hostility/Considerateness	
		PRETD	Task Orientation/Distractibility	
		PREEI	Extraversion/Introversion	
	Classroom Posttest	POSTHC	Hostility/Considerateness	
		POSTTD	Task Orientation/Distractibility	
		POSTEI	Extraversion/Introversion	

results, indicating a strong underlying structure, only the final principal components solution with Varimax rotation is reported here. It was decided to use the principal components solution as the basis of analysis and discussion because in this instance it provides a very good approximation of common factor analysis, while simultaneously permitting direct computation of factor scores without the need to estimate them. Table 2 presents the factor structure matrix for this solution. The factors appear to separate essentially into four groups or domains: Background, Duration/Attendance, Cognitive Tests, and Behavior Ratings. There is some overlap between Background and Duration/Attendance, and between Cognitive Tests and Behavior Ratings; but there is very little overlap between Background and Duration/Attendance on the one hand, and Cognitive Tests and Behavior Ratings on the other hand. In the following discussion, the rotated factors will be discussed in the context of these domains.

Background Factors

Factor IV - Parent Education. While the loadings of the tests and ratings on this factor are generally quite low, they consistently show a drop from pretest to posttest, suggesting that parent education has a slight effect on pretests but a lesser effect on posttests. It appears also that parents with more education tend to have fewer children and they have their children enrolled in PreK at an earlier age or earlier in the program.

Factor VII - Family Income and Family Size. No pattern was discernible among loadings of other variables. Living space (NOROMS) in the residence has a substantial correlation with family size despite the low income level of the study group (correlation between NOROMS and NOCHLD is .39).

Table 2

Principal Components Analysis of Prekindergarten Variables
Varimax Rotated Factor Matrix

N = 595

	Factors									
Variable	I	II	III	IV	V	VI	VII	VIII	IX	X
Background										
AGEPREW	24			-33	29				-48	
EXPK								74		
MOED				78						
FAED	22			78						
INCOME				32			65			
RESIDE										86
NOADULT							66			
NOCHLD			-20	-44			44			24
NOROMS							74			
Duration/Attendance										
DABETW									83	
ATTENDCE								68	21	
Walker										
PRESIM	27				66	27				
PREDIFF	38				63					
PRENUMA	24				65					
PREMISS					62	25				
POSTSIM	23					72				
POSTDIFF	43					58				
POSTNUMA	36					53				
POSTMISS						70				
Cooperative										
PRERESP	74				24					
PREVOC	74		22		20					
PRENUM	68				38					
PRESENS	72				30					
POSTRESP	65					40				
POSTVOC	71					31				
POSTNUM	54					45				
POSTSENS	54					42	-21			
Peabody										
PREPEAB	70				29					
POSTPEAB	69									
California										
PRECAL	29	51	50		29					
POSTCAL	26	62	49			25				
Classroom										
PREHC		-76								
PRETD		68			28					
PREEI			83							
POSTHC		-81								
POSTTD	23	72				28				
POSTEI			86							

Percentage of Variance accounted for = 63.4%

NOTE: For readability, loadings lower than .20 and decimal points have been eliminated.

Factor X - Length of Residence. Apparently accounts essentially for the unique variance in RESIDE. The small loading from NOCHLD (number of children) is probably of little significance in view of the fact that the correlation between the variables RESIDE and NOCHLD is only .03.

Cognitive Factors

Factor I - Factual and Conceptual Knowledge. The Cooperative Inventory, which was developed from "an inventory highly saturated with a conceptual factor" (Educational Testing Service, 1970, p. 11), loads highly on this factor. So also does the Peabody Test, indicating that the factor has a high verbal content. The California Scale is represented to a lesser extent, reflecting the cognitive aspect of these ratings. From the Classroom Inventory, only the Task-Orientation/Distractibility subtest has any significant loading here. There is little difference between pretest and posttest loadings.

Factor V and VI - Perceptual Discrimination. These two factors must be treated together since they appear to be pre and post versions of essentially the same dimension. This dimension we have labelled "Perceptual Discrimination" since it depends, in both factors, chiefly on the four Walker subtests which are essentially measures of perceiving similarities, differences and whole-part relationships. While the subtests from the Cooperative Inventory have only light or moderate loadings on these factors, the second two (PRENUM/POSTNUM and PRESENS/POSTSENS), which have some discrimination content, load slightly higher than the first two, which have to do more with knowledge and awareness of environment.

The statement that two factors appear to be pre and post versions of the same dimension would seem to be contradictory since we are talking about two orthogonal

factors. In fact, the underlying dimensions they represent are not actually orthogonal. Factor plots of the orthogonal Varimax rotation indicate that there is some degree of actual correlation, and an oblique rotation produces similar factors which have a correlation of .19. Even given some correlation between the factors, however, we still are left with two different factors or dimensions both apparently depending on variance produced by roughly the same set of items. The explanation may be that the items tap different abilities at the time of posttest than they did at the time of pretest. Thus, what we label "perceptual discrimination" based on inspection of the item content is probably not really the same thing after the growth/treatment interval has occurred.

The Peabody Test, the California Scale and the Cooperative Inventory subtests all have low or nonsignificant loadings on these factors, but in every case the pretest loads higher than the posttest on factor V, while on factor VI the reverse is true. Thus, on the one hand, factor V appears to represent communality across pretests while factor VI represents communality across posttests; on the other hand, both factors together represent some common dimension or ability measured chiefly by the Walker subtests and only to a lesser extent by parts of the Cooperative Inventory, the California Scale and the Task-Orientation/Distractibility subscale of the Classroom Behavior Inventory. A similar single factor shows up also when pretests and posttests are factor analyzed separately.

This pre-post factor split may be due also to the fact that these factors represent predominantly Walker variance and the correlation of pretest with posttest is lower in the case of the Walker than with any of the other tests or ratings (Table 3).

Table 3

Pretest-Posttest Correlations

WALKER	COOPERATIVE	PEABODY	CALIFORNIA	CLASSROOM
SIM .41	RESP .57	.65	.62	HC .63
DIFF .39	VOC .57			TD .63
NUMA .32	NUM .54			EI .64
MISS .26	SENS .59			

The two factors V and VI, then, may indicate lower stability over time for the Walker which may be, to some extent, due to lower internal consistency. The internal consistency of the two 5-item subtests is undoubtedly very low; K-R 21 estimates are .57 and .29 for pretest, and .61 and .16 for posttest. These are probably underestimates, but, in any case, are severely low. However, the reliability of the first two subtests is comparable to the Cooperative subtests (Table 4).

Table 4

K-R 21 Internal Consistency Estimates for Walker & Cooperative

	WALKER			COOPERATIVE	
	Pretest	Posttest		Pretest	Posttest
SIM -	.84	.67	RESP -	.74	.68
DIFF -	.70	.63	VOC -	.77	.65
NUMA -	.57	.61	NUM -	.89	.62
MISS -	.29	.16	SENS -	.93	.70

This comparability suggests that the lower stability of the Walker is due not so much to lower internal consistency as it is due to a greater change from pretest

to posttest in the pattern of abilities required to perform successfully, than was true of the other instruments. That is, some phenomenon (perhaps maturation or experience in the program) causes greater change in the abilities required to perform well on the Walker (Perceptual Discrimination) than it does in those traits required to score high on the other tests and rating scales.

Behavioral Factors

Factor II - Social Adjustment or Constructive Participation. Hostility/Considerateness and Task-Orientation/Distractibility from the Classroom Behavior Inventory contribute to this factor, as does a large portion of the California Scale variance. The fact that there are low to moderate loadings for Task-Orientation/Distractibility also on cognitive and reasoning Factors I, V and VI lends some support to a model hypothesized by Schaefer (1975, p. 7) in which Task Orientation is viewed along with Intelligence as a major component of a construct which he calls "Competence". On the other hand, the fact that the predominant loadings for this variable (.68 and .72) are on factor II suggests that for the PreK children in this study, Task-Orientation/Distractibility is more closely related to Hostility/Considerateness than to Intelligence/Retardation, that is, it is more of a personality factor than an intelligence factor.

Factor III - Extraversion/Introversion. This factor has heavy loadings from the Extraversion/Introversion subtest of the Classroom Behavior Inventory and moderate loadings from the California Scale. There is little difference between pretest and posttest. Schaefer, Peterson (1965) and others have observed that this factor and a Love/Hostility factor, similar to Factor II above, have been repeatedly replicated as the two major dimensions of rated social behavior.

Duration and Attendance Factors

Factor VIII - Hours present and Prior PreK Experience. There is no apparent meaning to this factor other than the moderate covariance of these two variables (correlation is .19). No pattern of loadings from other variables is discernible.

Factor IX - Elapsed time in days between Pretest and Posttest. Age varies inversely with elapsed time, meaning only that children who start the program later tend to be older. Again, there is no apparent pattern of loadings from other variables.

Dimensionality of Rating Scales

Since the California Scale and the Classroom Behavior Inventory were so obviously split on two or more factors, a closer look at the dimensionality of these complex scores was indicated. This was also encouraged by Proger's (1974) comments on the California Scale. He hypothesized four California Scale factors on the basis of face validity. These were: work habits, personality, communication, and interpersonal relations. To investigate the dimensionality of these scales we performed a principal components analysis on the California posttest item scores, on the Classroom posttest item scores and on the combined set of California and Classroom posttest item scores. The results of the California analysis are shown in Table 5. Five factors (those with eigenvalues greater than 1.0) were rotated. The items with the highest loadings on each factor are shown with their respective loadings. The item labels are those used on the rating sheet itself; the assigned factor labels were based on the content of the items loading on each factor.

Table 5
Principal Components Analysis of
California Preschool Social Competency Scale Posttest Item Scores
Varimax Rotated Factor Matrix N = 1726

Item Number and Label	FACTORS				
	Consideration of Others	Task Orientation	Extraversion	Verbal	Response to the Unfamiliar
	I	II	III	IV	V
1. Identification		25		68	
2. Using Names of Others			25	72	
3. Greeting New Child	30			31	
4. Safe Use of Equipment	56	39		29	
5. Reporting Accidents	39		29	50	
6. Continuing in Activities	36	66			
7. Performing Tasks	44	62			
8. Following Verbal Instructions		64		46	
9. Following New Instructions		65		46	
10. Remembering Instructions		70		40	
11. Making Explanation to Other Children		45	43	51	
12. Communicating Wants	28		33	46	34
13. Borrowing	81				
14. Returning Property	79				
15. Sharing	74				
16. Helping Others	40		52	25	
17. Playing with Others			81		
18. Initiating Involvement			81		
19. Initiating Group Activities			80		
20. Giving Direction to Play		34	67	31	
21. Taking Turns	75				
22. Reaction to Frustration	46	41	25		
23. Dependence upon Adults	28	57			32
24. Accepting Limits	72	27			27
25. Effecting Transitions	37	46			37
26. Changes in Routine	33				73
27. Reassurance in Public Places					78
28. Response to Unfamiliar Adults			50	33	49
29. Unfamiliar Situations		35	38		46
30. Seeking Help	26	50			29

NOTE: For readability and emphasis, loadings lower than .25 and decimal points have been eliminated.

Percentage of Variance accounted for = 61.4%

As expected, there is an Extraversion factor and a Verbal factor corresponding to factors I and III in the factor analyses of composite scores which, was described earlier. However, the Social Adjustment factor obtained in the analyses of composite scores here becomes three factors: Consideration of Others, Task-Orientation and Response to the Unfamiliar.

Proger's hypothesized "work habits" and "communication" factors correspond closely with our Task Orientation and Verbal factors respectively. The items he surmised would form a "personality" factor (perhaps too broad a term) actually fall out more precisely on three factors, Consideration of Others, Task Orientation and Response to the Unfamiliar. Proger's fourth factor, "interpersonal relations", also splits more precisely into two factors here, namely Consideration of Others and Extraversion.

It is apparent that the California Scale is measuring along several dimensions of personality or social competency (at least five). Indeed, many of the items are complex, with significant loadings on two or more factors. Since it is not likely that the PreK program would have an equal effect on each of these dimensions, the chances of determining the presence of program effects, if any exist, may be enhanced by using factor scores based on the above factors rather than a single composite score as the criteria of program effectiveness.

The results of the factor analysis of the 18 items of the Classroom Behavior Inventory are shown in Table 6. This factor loading matrix essentially replicates the results obtained by Schaefer (1975) from 564 subjects in grades K-6. This replication, despite the difference in age groups, indicates a marked stability in the factor structure for this scale. Although there is some correlation among

Table 6

Principal Components Analysis of
Classroom Behavior Inventory Posttest Item Scores
Varimax Rotation

N=1679

	ITEM NO.	FACTORS I	II	III
Hostility	5	-14	83	-02
	11	-10	82	-02
	16	-14	81	00
Considerateness	6	46	-62	06
	13	22	-75	-02
	15	28	-65	06
Task-orientation	2	82	-15	-09
	10	78	-22	-13
	18	82	-17	-09
Distractibility	4	-79	22	04
	9	-68	37	01
	14	-79	08	22
Extraversion	1	-01	-15	-79
	8	28	23	-73
	12	03	15	-76
Introversion	3	-13	-17	74
	7	02	14	83
	17	-16	08	75

Percentage of Variance accounted for = 64.5%

obtained subscale scores, the fact that the same items used to determine the subscale scores also determine the corresponding factor scores justifies the use of the subscale scores in further analysis. The results here are similar to the California factor analysis above, the difference being that the California Scale has a Verbal factor and a Response to the Unfamiliar factor which seem to be lacking in the Classroom Behavior Inventory.

A principal components analysis was also performed on the combined set of items from both the California and the Classroom. Six factors were rotated and

labeled: Hostility/Considerateness, Task-Orientation/Distractibility, Verbal, Extraversion/Introversion-A, Extraversion/Introversion-B and Response to the Unfamiliar. Thus the five previously discovered factors are repeated with the same pattern of factor loadings. The Extraversion factor, however, is here split into two factors. The A factor has moderate loadings from the California Scale and heavy loadings from the Classroom scale, while the B factor has moderate loadings from only two of the six Classroom items, and moderate to heavy loadings from the California Scale. The meaning of this is not apparent, but the extraversion dimension is evidently not precisely the same for the two rating scales.

Pearson Product-Moment correlation coefficients were calculated for the relationships between the California and the Classroom factor scores (Table 7).

Table 7

Intercorrelations of Factor Scores from
California Preschool Social Competency Scale and Classroom Behavior Inventory

		CALIFORNIA		
CLASSROOM		Hostility	Task Orientation	Extraversion
	Considerateness	-.62	.04	.10
	Task Orientation	.31	.64	.04
	Introversion	.05	-.01	-.58

The correlations between theoretically related dimensions are moderately high (-.62, .64 and -.58), thus confirming the correspondence of these three factors across the two rating scales.

Summary

Through factor analysis the original data, 37 variables in all, were reduced to ten factors. The nine background variables can be expressed in three factors; the 18 cognitive variables reduce to three factors; the eight behavioral variables reduce to two factors; and the two duration and attendance variables remain as two factors. These factors, as reported here, would not be suitable for regression analysis in the search for program effects. One reason is that the cognitive and behavioral factors contain both pretest and posttest elements; another reason is that the Attendance factor would be orthogonal to and uncorrelated with all of the other factors. Other analyses, however, performed without Attendance data and including only pretest or only posttest variables, have produced factors very similar to those reported here. From these analyses some use might conceivably be made of factor scores in further research. In any case, the ordering of the large number of variables into a smaller number of interpretable factors affords more insight into the structure of the data set. We know that the data is highly dimensional; it contains not one dimension, but at least ten dimensions. We also know that the data has a strong underlying structure as evidenced by the consistency of the factor patterns when two different techniques of factor analysis were applied to various combinations of subsets of the data.

The Peabody and the Cooperative load on the same factor. They contain essentially the same general cognitive/verbal dimension. They do not, however, overlap so much that they could be considered redundant (the pretest correlation is .65, the posttest .52).

The difference in factor structure among the cognitive and behavioral variables from pretest to posttest appears to be minimal with the possible exception of the Walker subtests. It is not clear whether the pretest-posttest difference in the Walker subtests is due to growth in the children or to instability in the test. Aside from the Walker, the stability in factor structure from pretest to posttest is considerable.

The factor analysis of the Classroom Behavior Inventory item scores is essentially a replication of findings obtained in the development of that scale and indicates a marked stability for the instrument. The subscale scores, which are based on the original factors, are therefore probably as useful in further analysis as factor scores would be. The factor analysis of the California Scale shows that this scale has three components in common with the Classroom Inventory and additionally contains two other factors. This comparability could be considered as an indicator of construct validity. The clear five-factor breakdown leads to the conclusion that orthogonal factor scores in place of the total test score could be a valuable contribution in subsequent regression analyses.

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